MSN Life Sciences Private Limited

LS3 TSD Activities

MSN Life Sciences Pvt. Limited
Date: 27-02-2024

Capacity Enhancement or Release

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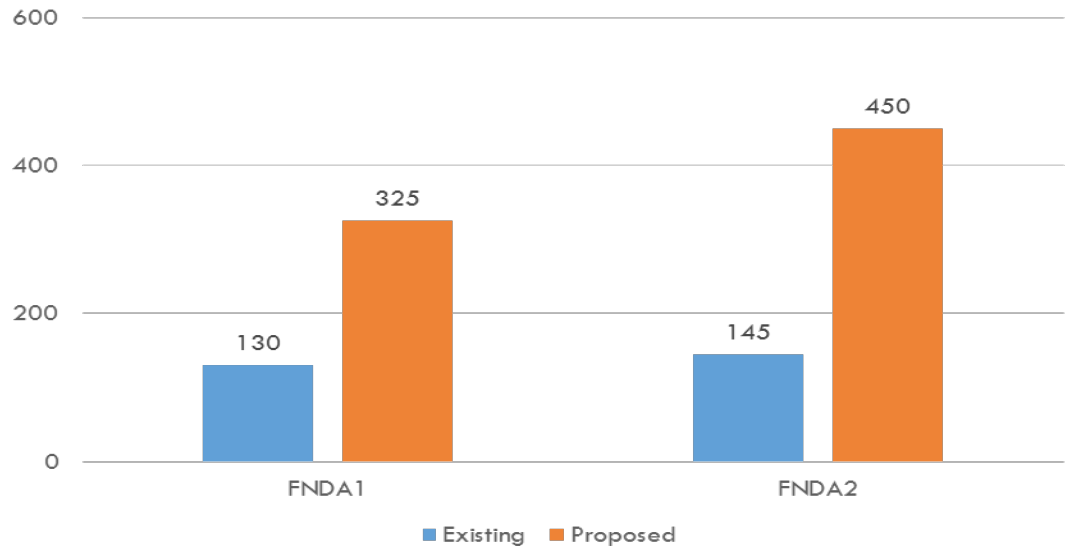
Product:

Flecainide Acetate

FNDA1		FNDA2	
Existing	Proposed	Existing	Proposed
130 Kg	325 Kg	145 Kg	370 Kg



FNDA1: Scale-up from 130 Kg to 325 Kg in existing B-Block,

FNDA2: Scale-up from 145 Kg in F-Block Phase-IV to 450 Kg in F-Block Phase-IV.

Existing: 1.07 TPM.

Proposed: 4.30 TPM.

Current Status:

Stage-1 (FNDA1)- Scale-up execution from 130 Kg to 325 Kg Completed in B-Block.

Stage-2 (FNDA2)- Currently regular batch (145 Kg B.Size) with LS-3 R&D modified process for yield improvement are u/process, scale-up to be implemented.

Total Release of ~1795 KL Days (~60%)

Capacity Enhancement or Release

MSN Life Sciences Private Limited

Product:

Dabigatran Etexilate Intermediate

LDB1: Scale-up from 480 Kg to 640 Kg B.Size in I&C-Blocks.

LDC1: Scale-up from 300 Kg to 500 Kg B.Size in C-Block.

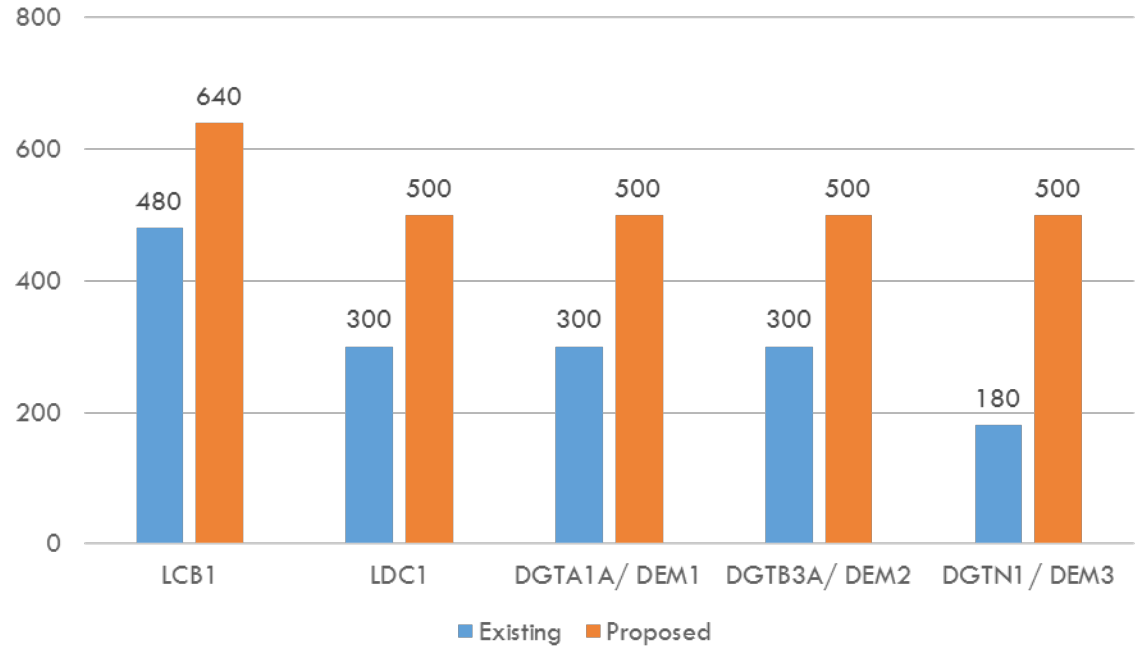
DGTA1A: Scale-up from 300 Kg in I-Block to 500 Kg B.Size in B-Block.

DGTB3A: Scale-up from 300 Kg to 500 Kg B.Size in C-Block.

DGTN1/ DEM3: Scale-up from 180 Kg in I&F-Blocks to 500 Kg B.Size in C-Block with additional Centrifuges installation for purifications.

Scale-up proposed to meet the monthly requirement of 5 TPM DEM3 & 14 TPM LDC1 material from LS3 Unit.

LDB1		LDC1		DGTA1A/ DEM1		DGTB3A/ DEM2		DGTN1/DEM3	
Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
480 Kg	640 Kg	300 Kg	500 Kg	300 Kg	500 Kg	300 Kg	500 Kg	180 Kg	500 Kg



Current Status: LDB1, LDC1, DGTA1A & DGTB3A stages scale-up Completed as per proposal. DEM3 currently 180 Kg scale batches are under process in I-Block & F-Block, 500 Kg scale-up to be planned in C-Block.

Capacity Enhancement or Release

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Product: Ranolazine

RLNA1: Scale-up from 500 Kg in A-Block to 900 Kg in C-Block,

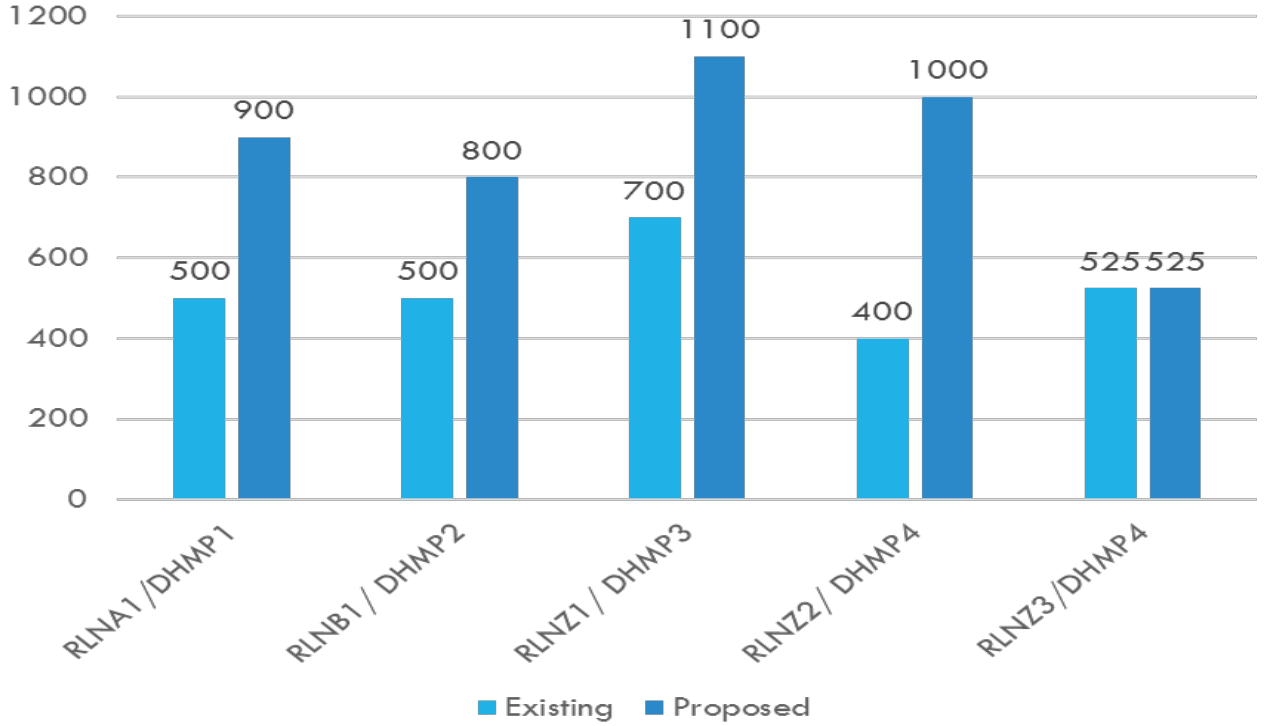
RLNB1: Scale-up from 500 Kg in A-Block to 800 Kg in C-Block.

RLNZ1: Scale-up from 700 Kg in B/A-Block to 1100 Kg in C-Block.

RLNZ2: Scale-up from 400 Kg in E/F-Block to 1000 Kg in C-Block.

RLNZ3: Additional cleanroom E-III along with existing F-IV with 525 Kg Batch Size.

RLNA1/ DHMP1		RLNB1/DHMP2		RLNZ1/DHMP3		RLNZ2/DHMP4 (Crude)		RLNZ3/DHMP4 (Pure)	
Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
500 Kg	900 Kg	500 Kg	800 Kg	700 Kg	1100 Kg	400 Kg	1000 Kg	525 Kg	525 Kg



Existing: 5.5 TPM.

Proposed: 17 TPM.

Current Status: RLNA1 Scale-up completed. Campaign stopped currently due to Dabigatran product. Remaining stages scale-up to be implemented in next campaign.

Total Release of ~9154 KL Days (~16%)

Capacity Enhancement or Release- Proposal

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Product:

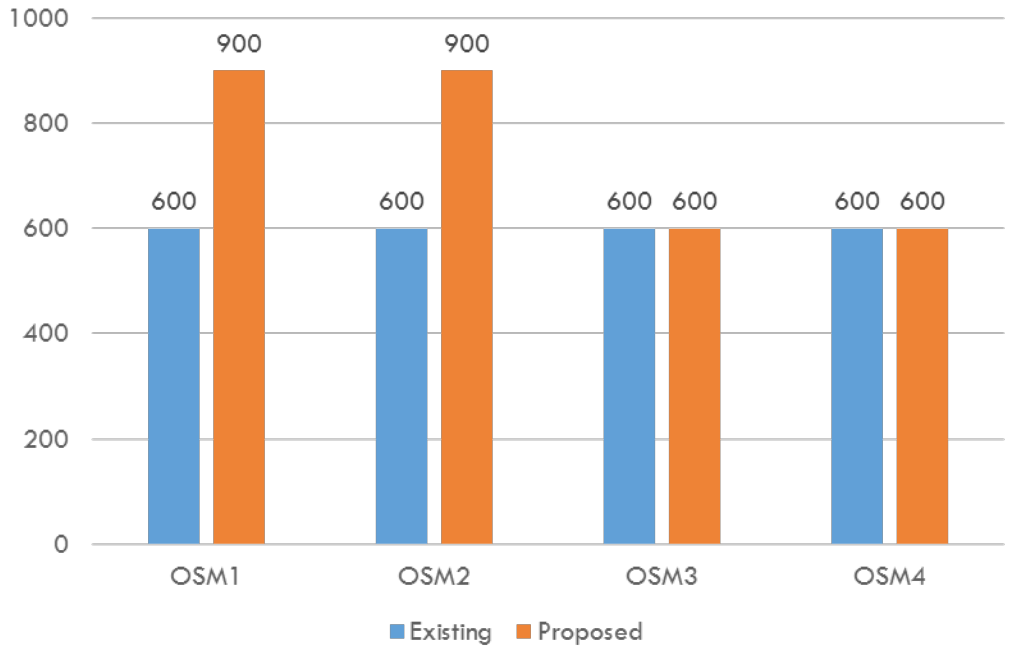
Oseltamavir Phosphate KSM

OSM1 & OSM2: Scale-up from 600 Kg in B-Block to 900 Kg in A-Block by utilizing storage tanks as agitated tanks for work-up.

OSM3: Capacity enhancement from existing B-Block to A-Block by utilizing storage tanks as agitated tanks for work-up.

OSM4: Capacity enhancement by including additional reactor for crude in existing B-Block.

OSM1 & OSM2		OSM3 & OSM4	
Existing	Proposed	Existing	Proposed
600 Kg	900 Kg	600 Kg	600 Kg



Existing: 8.82 TPM.

Proposed: 15.12 TPM.

Current Status: Scale-up proposed to utilize the existing facility in best possible way. To be discussed with senior team for indenting & implementing additional requirements- PBT agitators for Jacketed storage tanks & FFE's for distillation operations.

Total Release of ~16,868 KL Days (~44%)

New Products at LS-III

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New Products Status at LS-III

S.#	Product	API Qty	Stage Code		Raw Materials			Tech Transfer	Facility Readyness		Documentation		Execution					
			Stage	Code	Indent	Received	Analysis		Approvals	Modification	Preparation	Approval	Trial	Validation-1	Validation-2	Validation-3	Commercial	Analysis
1	Mesalamine	700 Kg	Stage-1	MEAM1	Completed			09-10-2023	Completed		Completed		Completed				NA	Completed
			Stage-2	MEAM2	Completed				Completed		Completed		Completed					Completed
			Stage-3	MEAM3	Completed				Completed		Completed		Completed				Pending	V2 & V3 U/Analysis
2	Vonoprazan Fumarate	100 Kg	Stage-1	VFNA1	Completed			Completed	Completed		Completed		Completed					
			Stage-2	VPNA1	Completed			05-02-2024	Completed		Completed		U/ Process					
			Stage-3	VPNA2	Completed		Pending											
			Stage-4	VPNA3	Completed		Pending											
			Stage-5	VPNA4	Completed		Pending											
3	Chlorthalidone	500 Kg	Stage-1	CRTA1	Completed			Completed	Completed		Completed		Completed					
			Stage-2	CRTD1	Completed			17-02-2024	Completed	U/ Process	Completed	U/ Process	Planed on 24/02/24					
			Stage-3	CRTD2	Completed		Pending											
			Stage-4	CRTD3	Completed		Pending											
			Stage-5	CRTD4	Completed		Pending											
4	Vericiguat	7 Kg	Stage-1	VRGT1	Completed			Completed	Completed		Completed		Completed					
			Stage-2	VRGT2	Completed		Pending											
			Stage-3	VRGT														

Trouble shooting

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PIN MILL Trials for Levetiracetam To Meet Desired PSD	
Product & Stage:	**Levetiracetam Pharma (LVTC2)**
Existing Situation	**Requirement**
Levetiracetam Pharma material is coarser and PSD is not meeting the requirement. ~5 to 6 times Milling operation is being performed in Multimill for Sieve Top materials to meet the required PSD.	Required PSD range & Regular Trend in validations is D90 ~165 Microns.

Proposal:

1) As the required PSD (~165 microns) is less than the multi mill mesh size (i.e. 0.25 mm/ 250 microns), material is constantly passing through miller mesh and PSD is not meeting the requirement.
2) Pin Mill Trials were performed for Levetiracetam Sieve Top material to meet the desired PSD (D90 ~165 microns) and to avoid multiple milling operation (~5-7 times)

Results & Way forward:

Below are the Pin Mill trail results.
With 3000 RPM, D10-20.3 microns, D50-81.2 microns & D90-187 microns
With 3300 RPM, D10-17.6 microns, D50-70.5 microns & D90-164 microns.
Pin mill material with 3300 RPM is meeting the requirement, to be implemented in regular commercial batch.
Material loss can be avoided, Effective clean room utilization & manpower by implementing Pin Mill operation in place of multiple milling operations (5-7 times).

Unwanted Salt Filtration Optimization in LDC1 Stage of Dabigatran

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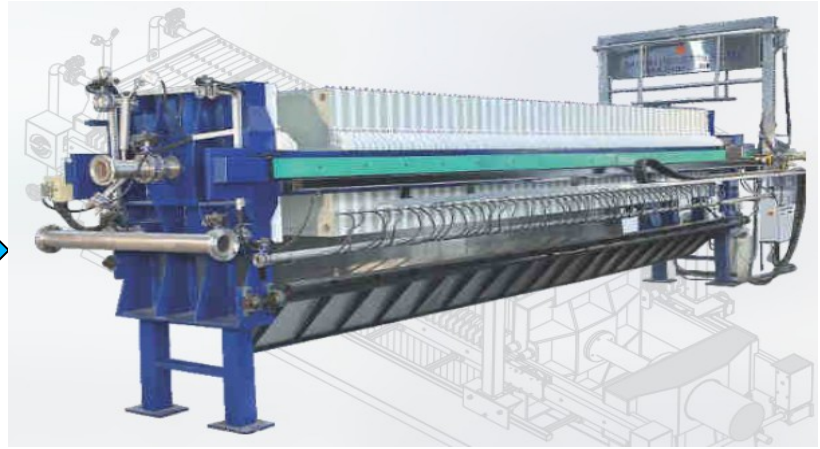

Challenges in Existing Open Nutsche Filter:

- Existing Filter Capacity- 1.0 KL x 2 Nos of Open Nutsche Filters.
- Rate of Filtration & filtration flux is slow (<20 LPM/m2) due to slimy nature of unwanted salt resulting in impact on productivity.
- Filtration in hot condition 45-50°C & Reaction mass is mixture of Water + Toluene resulting in potential fire hazard during open handling.

Advantages in Membrane Press Filter:

- Rate of Filtration & filtration flux will be more in proposed Filter Press.
- Process cycle time will be reduced due to more filtration area.
- Reduces the wash water consumption.

Current Status: PO released for Membrane Press Filter with 15 m2 area for I-Block, Trial to be taken after receiving the equipment to LS-III

Customer Support for PSD

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S.#	Block	Product	Activity	Status	Remarks
1	F-Block	Opicapone	2.0 Kg x 2 Nos Samples for ABBOTT with Below PSD Specifications. **Fine Material (2 Kg):** D(95): Not more than 10 µm D(50): Not more than 6 µm D(10): Not more than 4 µm **Coarser Material (2 Kg):** D(95): Not more than 70 µm D(50): Between 10-45 µm D(10): Not less than 4 µm	Existing Material PSD Trend is D(95) : 11-14 µm D(50) : 4-5 µm D(10) : 2-3 µm **Fine Material (2 Kg):** Micronized material with 0.6 ± 0.2 Kg/cm2 feed & chamber pressure is meeting the requirement, Dispatch completed. **Coarser Material (2 Kg):** Batch executed at Pilot plant with modified process & material dispatched with coarser specification.	
2	F-Block	Mesalamine	MSNF requirement for 6.0 Kg x 2 Nos with below PSD specifications. **Coarser Material (2 Kg):** D(90): 50-100 µm **Fine Material (2 Kg):** D(90): Below 10 µm	**Coarser Material (2 Kg):** Material with Additional Milling operation (0.5 mm mesh & full RPM) is meeting the specification. Material dispatched with D90- 82 µm **Fine Material (2 Kg):** Micronization trial with 6.5 ± 0.2 Kg/cm2 feed & chamber pressure is meeting the required specification. Analysis Under Process (D90- 6.8 µm) & Material	

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Thank you